



## **DIGI-STORE® DS-2**

### **FAST, BI-DIRECTIONAL, ASYNCHRONOUS MAGNETIC TAPE READ/WRITE UNIT**

#### **HANDLES ANY CODE UP TO 8 LEVELS**

The new Digi-Store DS-2 outperforms and offers many advantages over paper tape punch and reader systems for automatic typesetting, Data-Phone\* equipment, buffer storage, rate changing, direct computer input-output utilizing existing paper tape connections, telemetry, machine and test equipment programming, and other digital communications and data handling applications. Check these features . . .

- Single unit operates in either read or write mode at asynchronous speeds up to 333 characters/second (3330 wpm). A functional replacement for paper tape punch and tape reader.
- Completely reversible. Reversal time only 4 ms. Write-to-read recovery time only 50 ms.
- Packing density of 1000 characters/foot — over 8 times that of paper tape. Continuous 50-foot tape loop stores up to 50,000 characters.
- Solid state reliability. Designed for 19" rack mounting — up to 4 units per rack. Well-styled packaging also makes unit suitable for desk use.
- Parallel-to-serial or serial-to-parallel logic available. Modular construction permits variety of configurations to suit individual needs.
- Electrically compatible with standard paper tapes systems. Eliminates tape bulk and chad disposal problems. Magnetic tape can be reused without erasing.
- Coded DS-2 tape has been used 46,000 times with no error in original coded message. (Test arbitrarily stopped at this point.)

\*Trademark



## REDUCES COST OF DATA-PHONE\* INSTALLATIONS

The combination of a single DS-2 unit, an IBM Selectric typewriter serving as an I/O device, and special Trak control logic for marrying the DS-2 to DATA-PHONE\* equipment is a cost-cutting replacement for commonly used paper tape systems employing more expensive I/O units, a tape reperforator and tape reader.

In such applications, the speed of the DS-2 enables maximum capacity utilization of the transmission line. The Selectric typewriter operates at 15 characters per second — one third faster than most similar devices. Also, as an extra benefit, the same typewriter can be used for regular office functions when the system is not on line.

The 16 mm double-sprocketed magnetic tape of the DS-2 can be reused *thousands* of times — a factor which quickly offsets the tape's higher initial cost as compared to paper tape, and results in important long-term operating



savings. In addition, less tape length is required because of the DS-2's higher packing density — and there is no nuisance of chad removal.

This Trak system of a DS-2 unit, control logic and typewriter is available in desk type and desk top models at considerably less cost than other equipment of comparable performance capabilities.

## IDEAL FOR AUTOMATIC TYPESETTING

By replacing all paper tape operations in automatic newspaper typesetting systems, Trak Digi-Store DS-2 equipment enables input and output to and from a computer (used for justifying and hyphenating news copy) at much higher speeds than normally attainable. Once a typist has put a story on the magnetic tape of the DS-2, the recorded tape can feed the computer at speeds up to 333 characters per second — and computer output speeds of the same magnitude can be handled.

Because of these DS-2 capabilities, the computer can keep more line casting machines busy — and thus result in greater operating efficiency than is possible with paper tape equipment. The DS-2 features of higher recording density and tape reuseability are additional advantages.

In addition to automatic newspaper typesetting, DS-2 equipment is applicable to book, magazine and commercial typesetting.

## DIGI-STORE DS-2 SPECIFICATIONS

<b>RECORDING MEDIUM</b>	16-mm double-sprocketed magnetic tape
<b>READING SPEED</b>	Asynchronous up to 333 characters/sec
<b>WRITING SPEED</b>	Asynchronous up to 333 characters/sec
<b>RECORDING DENSITY</b>	1000 ch/foot, 25 characters/frame
<b>RECORDING CHANNELS</b>	Up to 8
<b>MODES</b>	Controlled by logic levels into a 1k load connected to -12V Read = "1"                      Forward = "1" Write = "0"                     Reverse = "0" Recovery time, write-to-read, 70 msec; minimum reversal time, 4 msec
<b>WRITE MODE:</b>	
<b>INPUTS</b>	Data — 8 levels, parallel; synchronous or asynchronous character rate, 0-333 per sec "0" = -8 to -12 volts • "1" = 0 to -1 volt Strobe — Positive transition of 6 to 8 volts amplitude, maximum rise time 10 $\mu$ sec, maximum source impedance 1000 ohms must accompany each character group; data levels must remain at least 2 msec after strobe

<b>READ MODE:</b>	
<b>INPUT</b>	Step command (identical to strobe in WRITE mode) — Positive pulse, 6 to 8 volts in amplitude, at least 20 $\mu$ s wide, maximum rise time 10 $\mu$ s, must be supplied to request each character readout; synchronous or asynchronous repetition rate 0-333 per sec
<b>OUTPUT</b>	8 levels, parallel, and their complements "0" = -8 to -10 volts • "1" = 0 to -1 volt Minimum load impedance: 3k
<b>OUTPUT DELAY</b>	Output levels are correct 3.5 msec after step command (strobe), and remain until 1.5 msec after next step command
<b>TIGHT-TAPE INDICATION</b>	Switch closure to ground
<b>MOUNTING</b>	Standard 19" rack mounting
<b>WEIGHT</b>	33 lbs
<b>SIZE</b>	19" x 8 $\frac{3}{4}$ " x 12". Digi-Stores are available in pairs in a 19" x 8 $\frac{3}{4}$ " x 24" frame. Space is available in this package for additional logic cards.
<b>POWER REQ.</b>	120 v, 50-60 cps
<b>CURRENT DEMAND</b>	While idling: 0.7 amp At maximum speed: 0.85 amp

## BUFFER-STORE SPECIFICATIONS

A Digi-Store Buffer combines two basic DS-2 units. When used in digital communications, it performs the function of a paper tape reperforator-transmitter-distributor.

**CODE:** Any code of up to 8 data levels.

**INPUT:** Parallel or start-stop serial at any rate to 3,330 wpm, (333 characters/sec.).

**OUTPUT:** Parallel or serial at any rate to 3,330 wpm, independent of input.

**STORAGE CAPACITY:** Up to 50,000 characters on 50 ft. continuous loop.

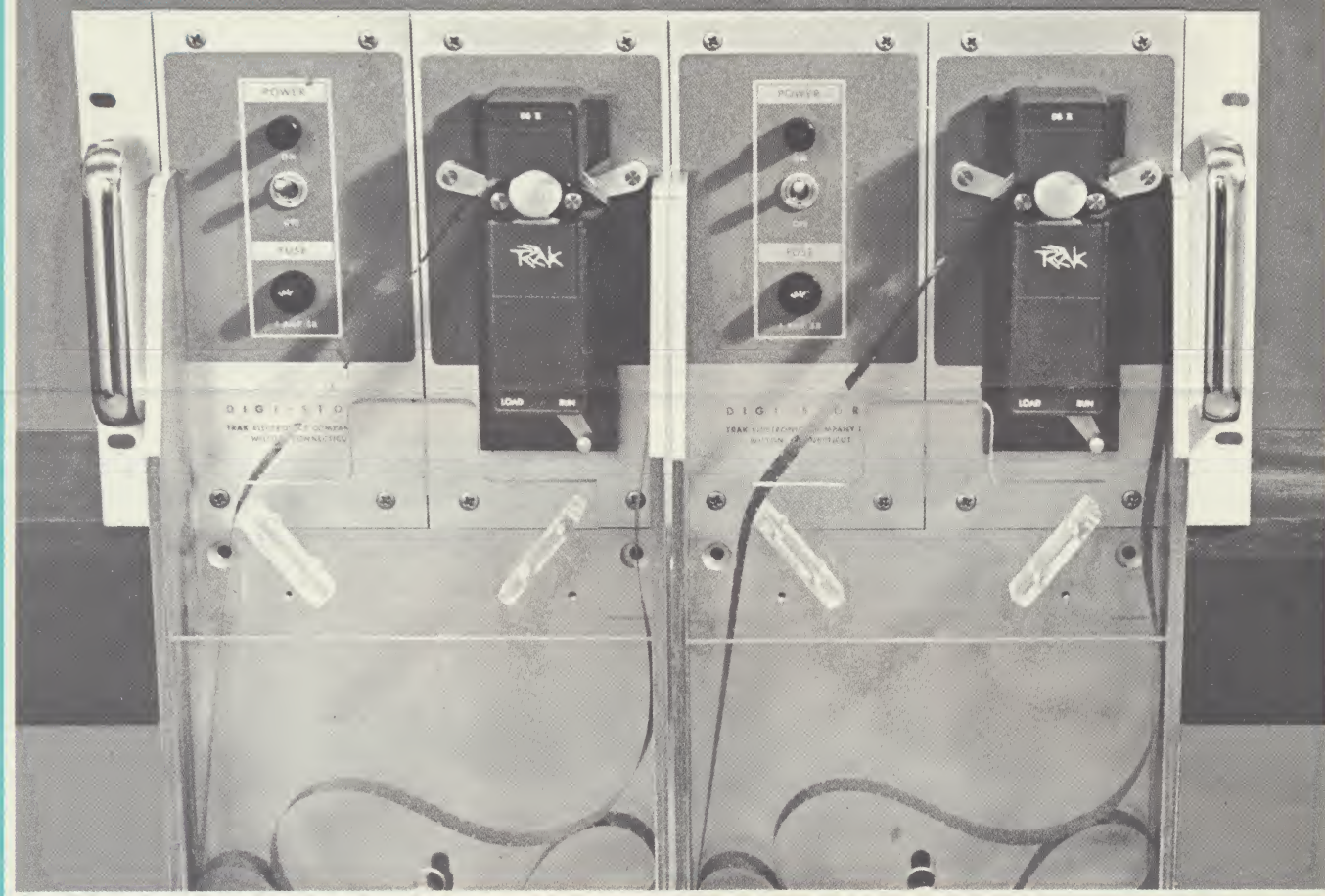
**MINIMUM STORAGE CAPACITY:** Zero. Last input character delivered to output.

\*DATA-PHONE — Mark of the Bell System

**TRAK ELECTRONICS COMPANY, INC.**

59 Danbury Road • Wilton, Conn. • Tel. (203) 762-5521





## **DIGI-STORE\* DS-2**

### **FAST, BI-DIRECTIONAL, ASYNCHRONOUS MAGNETIC TAPE READ/WRITE UNIT**

#### **HANDLES ANY CODE UP TO 8 LEVELS**

The new Digi-Store DS-2 outperforms and offers many advantages over paper tape punch and reader systems for automatic typesetting, Data-Phone\* equipment, buffer storage, rate changing, direct computer input-output utilizing existing paper tape connections, telemetry, machine and test equipment programming, and other digital communications and data handling applications. Check these features . . .

- Single unit operates in either read or write mode at asynchronous speeds up to 333 characters/second (3330 wpm). A functional replacement for paper tape punch and tape reader.
- Completely reversible. Reversal time only 4 ms. Write-to-read recovery time only 50 ms.
- Packing density of 1000 characters/foot — over 8 times that of paper tape. Continuous 50-foot tape loop stores up to 50,000 characters.
- Solid state reliability. Designed for 19" rack mounting — up to 4 units per rack. Well-styled packaging

also makes unit suitable for desk use.

- Parallel-to-serial or serial-to-parallel logic available. Modular construction permits variety of configurations to suit individual needs.
- Electrically compatible with standard paper tape systems. Eliminates tape bulk and chad disposal problems. Magnetic tape can be reused without erasing.
- Coded DS-2 tape has been used 46,000 times with no error in original coded message. (Test arbitrarily stopped at this point.)

\*Trademark





## Trak Electronics Company, Inc.

59 Danbury Road (Route 7) • Wilton, Connecticut • POter 2-5521

November 17, 1965

DS-2

Mr. T.H. Nelson  
Box 1546  
Poughkeepsie,  
New York

Dear Mr. Nelson,

We appreciate your recent inquiry.

Enclosed are descriptive brochures for the DIGI-STORE<sup>®</sup> Magnetic Tape Read/Write Units, which also describe the Teleprinter Buffer-Store and Rate Changer.

The DIGI-STORE<sup>®</sup> represents a long step forward in the field of asynchronous incremental digital recording. Its high speed, quietness, flexibility, lack of mechanical parts and linkages and lack of chad problems, together with the fact that one unit both reads and writes, make it the logical modern successor to punched tape equipment. It is compact (about a cubic foot), light in weight, rugged and completely of modular, solid-state construction. Maintainability is assured by plug-in card design in an open "basket" type frame.

Models DS-1 and DS-2 are the same in most essentials, a major difference being that the DS-2 is bi-directional; if desired, it will read back in reverse after writing forward, or any other combination of functions. In addition, its construction allows more flexible physical arrangement in a 19-inch rack panel.

The price and delivery of DIGI-STORE are as follows:

<u>Model</u>	<u>Price</u>	<u>Delivery</u>
DS-1	\$2,500.00 ea.*	Immediate
DS-2	\$3,300.00 ea.*	120 days ARO

\* F.O.B. Wilton, Connecticut

If you require further information or assistance, please do not hesitate to contact us.

Very truly yours,

William Doniger  
Vice President - Sales

wd:rmp  
Enclosures

tape. Since tape motion is bidirectional, each motor serves as either the leading or trailing drive for the tape, depending upon the forward or reverse control status of the TU55. A positive stop is achieved by an electromagnetic brake mounted on each motor shaft. When a stop command is given, the trailing motor brake latches to stop tape motion. Enough torque is then applied to the leading motor to take up slack in the tape.

Tape movement can be controlled by commands originating in a computer and applied to the

TU55 via a suitable DECtape control, or can be controlled by commands generated by manual operation of rocker type switches located on the front panel of the transport. Manual control is used to mount new reels of tape on the TU55, or as a quick maintenance check for proper operation of the control logic in moving the tape.

The solid state TU55 is completely compatible with the older Type 555 Dual DECtape Transport and may be used to expand systems using the Type 555 Transport.

## SPECIFICATIONS

### General

Overall Size - 10-1/2 in. high, 19-1/2 in. wide, 9-3/4 in. deep

Mounting - Standard 19 in. rack. Four #10-32 screws mount chassis track assembly which holds transport. Chassis can be extended 16-3/4 in. beyond mounting surface for maintenance.

Power Requirements - -15 vdc, 10 amp maximum, +10 vdc, 50 ma maximum, 115 vac  $\pm 10\%$ , 1.0 amp idle, and 2.0 amp maximum current (60-cps models standard, 50-cps models on request)

Connectors - Commands: two 18-terminal FLIP CHIP female connectors. Information: two 36-terminal FLIP CHIP female connectors

Cooling - Internally mounted fan is provided

Operating Temperature - 50°F to 100°F ambient

Humidity - 10 to 90% relative humidity

NOTE: The manufacturer of the magnetic tape for DECtape recommends 40 to 60% relative humidity and 60° to 80°F as acceptable for operating environment.

### Tape Characteristics

Capacity - 260 ft of 3/4 in., 1 mil Mylar sandwich tape

Reel Diameter - 2.8 in. empty reel, 3.9 in. for 260 ft of tape

Reel Diameter Ratio - 1:4 (maximum to minimum)

Tape Handling - Direct drive hubs and specially designed guides which float the tape over the head hydrodynamically. No capstans or pinch rollers are used.

Speed - 97  $\pm$  14 ips

Density - 350  $\pm$  55 bpi

Information Capacity -  $2.7 \times 10^6$  bits per reel assembled into computer-length words by external DECtape control

Tape Motion - Bidirectional

### Drive Characteristics

Times given are for 90% full speed.

Start Time - <200 msec

Stop Time - <150 msec

Turn Around Time - <200 msec

### Input Signals to Transport from Control

Commands\* - FORWARD (ground level assertion), REVERSE (ground level assertion), GO (ground level assertion), STOP (ground level assertion), and ALL HALT (negative level assertion) used to stop transport when computer halts.

Unit Select\* - SELECT 1 through SELECT 8 (ground level assertion)

Control - POWER CLEAR standard DEC negative pulse to clear MOTION flip-flop when computer power is turned on

### Output Signal from Transport to Control

Control - WRITE ENABLE standard DEC ground level for assertion

Price \$2,350

\*These signals are approximately -3v and -15v when supplied by a control unit designed to operate the Type 555 Dual DECtape Transport which uses relay switching logic circuits, or are standard DEC logic levels of ground and -3v when supplied by a control unit designed specifically to drive the TU55.





## Trak Electronics Company, Inc.

59 Danbury Road (Route 7) • Wilton, Connecticut • Porter 2-5521

March 16, 1965 06897

Mr. T. Nelson  
Systems Consult  
Box 1546  
Poughkeepsie, N.Y.

Dear Mr. Nelson:

We appreciate your recent inquiry.

Enclosed are our descriptive brochures for Trak Electronics Company's DIGI-STORE Magnetic Tape Read/Write Units, which also describe the Teleprinter Buffer-Store and Rate Changer.

Trak Electronics DIGI-STORE represents a long step forward in the field of asynchronous incremental digital recording. Its high speed, quietness, flexibility, lack of mechanical parts and linkages and lack of chad problems, together with the fact that one unit both reads and writes, make it the logical modern successor to punched tape equipment. It is compact (about a cubic foot), light in weight, rugged and completely of modular, solid-state construction. Maintainability is assured by plug-in card design in an open "basket" type frame.

Models DS-1 and DS-2 are the same in most essentials, a major difference being that DS-2 is bi-directional; if desired, it will read back in reverse after writing forward, or any other combination of function. In addition, its construction allows more flexible physical arrangement in a 19-inch rack panel.

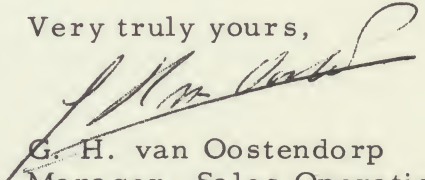
The price and delivery of DIGI-STORE is as follows:

<u>Model</u>	<u>Price</u>	<u>Delivery</u>
DS-1	\$2,500.00 ea *	Immediate
DS-2	\$3,300.00 ea *	120 days ARO

\*F.O.B. Wilton, Connecticut

If you require further information or assistance, please do not hesitate to contact us.

Very truly yours,

  
G. H. van Oostendorp  
Manager, Sales Operations

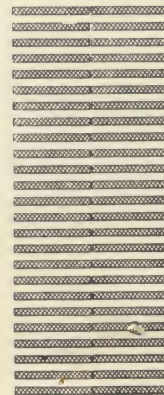
GHvO/emr  
Enclosure

Postage  
Will Be Paid  
by  
Addressee

No  
Postage Stamp  
Necessary  
If Mailed in the  
United States

**BUSINESS REPLY MAIL**  
FIRST CLASS PERMIT NO. 67, WILTON, CONN.

**TRAK ELECTRONICS CO., INC.**  
**59 DANBURY ROAD**  
**WILTON, CONNECTICUT**





## Digi-Store Reply Card

NAME \_\_\_\_\_

What uses do you plan for the DIGI-STORE?

TITLE \_\_\_\_\_

\_\_\_\_\_ Communications \_\_\_\_\_ Dataphone \_\_\_\_\_ Teletype

COMPANY \_\_\_\_\_

\_\_\_\_\_ Buffer Store \_\_\_\_\_ Bit Capacity

STREET \_\_\_\_\_

\_\_\_\_\_ Data Storage    Input Rate \_\_\_\_\_ Output Rate \_\_\_\_\_

CITY \_\_\_\_\_

\_\_\_\_\_ Other \_\_\_\_\_

STATE \_\_\_\_\_

TRAK ELECTRONICS COMPANY, INC., 59 DANBURY RD, WILTON, CONN.





## INCREMENTAL DIGITAL RECORDING ON MAGNETIC TAPE

Trak Electronics' DIGI-STORE<sup>®</sup> Model DS-2 is an incremental, asynchronous digital recording and readout device using sprocketed 16mm, 3-mil magnetic tape to record up to eight channels of parallel data at high speeds and densities. Here are some specifications--

Reading-Writing speed (bi-directional) - 333 char./sec  
Recording density - 1000 char./foot, 83.3 char./inch  
Read-Write data levels - "0" = -10 v, "1" = 0 v nominal  
Weight - 33 pounds complete  
Panel size - one or two on an 8-3/4 in. standard 19 in. panel

The tape fastened to the corner of this sheet is a sample of the double-sprocketed 16mm tape used in DIGI-STORE. This tape is also used in other industries, which insures availability.

Magnetic tape as a storage medium has many advantages over punched paper tape.

1. Storage density is eight times as high, 1000 vs 120 ch/ft
2. Tape is reusable thousands of times without erasure.  
These two features combine to make magnetic tape much more economical than paper tape in temporary storage applications. Cost-per-character is comparable but reuse of magnetic tape multiplies savings. Temporary storage of less than 50,000 characters can be on continuous loops in bins, eliminating expensive tape handling equipment and increasing savings even more.
3. Magnetic tape systems are inherently faster than paper tape systems since the latter are basically mechanical. DIGI-STORE, with one light, moving part moving at low velocity and small acceleration, records easily at speeds paper tape punches cannot reach without expense and bulk.
4. Magnetic tape is a cleaner, more easily-contained medium without "chads" or multiple sharp edges.

Present users of DIGI-STORE equipment include the following:

Associated Press	I. B. M.
Bendix Friez	Litton Industries
Canadian Pacific	National Research Council
Telecommunications	Remington Rand
Evansville State Hospital	Teleregister Corp.
General Dynamics - Pomona	Texas Instruments
G. P. I. Computers Ltd.	Western Union - Int'l.